# INITIATING A DEPARTMENTAL WELLNESS PROGRAM

EXECUTIVE LEADERSHIP

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## ABSTRACT

The Morris Township Fire Department has not established a total wellness program. This research paper provided information to determine the area of wellness that would best promote the safety and health of the members and be the starting point to initiate a program.

This research paper reviewed the contributing factors of firefighter line-of-duty deaths attributed to stress related heart attacks. Recognizing that the incidence of stress related heart attacks has accounted for almost one-half of all firefighter line-of-duty deaths in the last 20 years, this paper identified the need for total wellness programs and the importance of mandatory participation in regular physical fitness activities.

This paper employed historical research to identify (a) the relationship between the fire service and the general population's incidence of fatal heart attacks, (b) the controllable risk factors of stress related heart attacks, (c) by survey, the presence of these risk factors in recent related firefighter deaths, (d) the presence of these factors in the MTFD, and (e) methods of reducing firefighter heart attack deaths. Action research was used to create the projected retirement age chart.

The primary procedure was to gather and review current printed and electronic literature on the subject. The second was to survey fire departments that had recently suffered a related line-of-duty firefighter death. MTFD firefighters were interviewed and relationships to the statistics were determined.

The material was reviewed and used to make recommendations for the development of a complete wellness program beginning with the establishment of mandatory physical fitness activities for all department members.

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# INTRODUCTION

The Morris Township Fire Department (MTFD) is a combination department in northern New Jersey that is comprised of a career division and five volunteer fire companies. The office of the Fire Chief is responsible for the occupational health and safety of the department members. Within the past twenty years, three members of the career division have suffered fatal heart attacks. All three members were known to be regular users of tobacco products. At this time, the MTFD has no formal wellness program to assist and direct its members in reducing the controllable risk factors of stress induced heart attack.

The purpose of this research project is to determine a starting point for the development of a formal wellness program for department members. This information will be used to help motivate individuals to participate in the program. Historical research was used to examine the nature of heart attacks and their relationships to firefighters. It was then used to review activities for controlling the risk factors of stress induced heart attacks and identifying the elements of existing wellness programs.

Historical research was used to answer the following questions:

1. How does the rate of firefighter line-of-duty deaths from stress induced heart attacks compare to that of the general population?
2. What are the controllable risk factors of stress induced heart attacks?
3. Were these risk factors present in recent firefighter line-of-duty deaths from stress induced heart attacks?
4. Are these factors prevalent among members of the career division of the MTFD?
5. What can be done to prevent firefighter line-of-duty deaths from stress induced heart attacks?

Action research was used to create the chart that displays the age at hire and the projected age at retirement for members of the career division of the MTFD. These ages were then compared to the statistics for fire service stress related fatal heart attacks that were reviewed in the historical research.

The results should present a benchmark for the initiation of a departmental wellness program. This information will also be used to educate members of their need for individual participation in healthy activities.

## BACKGROUND AND SIGNIFICANCE

The Morris Township Fire Department is located in the County of Morris in northern New Jersey. The personnel are a combination of both career and volunteer members. The career division comprises approximately 20% of the suppression force. Typical staffing on weekdays between the hours 0800 and 1700 is the fire chief, the career captain, one or two firefighter/inspectors, the firefighter/mechanic, seven career firefighters, and any available volunteer members. Career firefighters are responsible for the operation of five engines; two trucks, the fire-rescue truck, and the air supply unit. Apparatus usually respond to emergencies with the operator as the only person on board, while the majority of the volunteers respond directly to the scene. The number of volunteers varies between the five fire companies. Two companies will steadily produce 3 to 7 firefighters during the day. The other three may produce as few as two, or even no members. After 1700 the department is staffed by two career firefighters operating two engines. Volunteers responding from their homes operate all other apparatus. Thus, it is not unusual for career firefighters to arrive at emergency scenes by

themselves. In this situation they not only have act as pump operator they are thrust into the role of initial Incident Commander.

Manning (April 1999) has identified that added stress is being placed upon company officers because of personnel cutbacks over the past twenty years. He states that they are forced to carry out "procedural necessities that otherwise would have been performed by one or two now missing members".

During the past twenty years firefighters have suffered 1,078 fatal heart attacks while on duty. (Washburn, LeBlanc, and Fahy, 1997)

The MTFD began a "First Responder" program in 1995 utilizing the career firefighters to evaluate and stabilize critically ill or severely injured victims until paramedics or the local ambulance squad could arrive. Witnessing the dead and dying creates an exponential increase in emotional trauma for firefighters. (Brooks, Parsons-Nicotta, and Richardson, 1998)

The career firefighters have also expressed feelings of frustration and stress from seeing apparatus left unstaffed during their normal duty hours because of budgetary restraints. In recent years the township administration has made efforts to recruit new volunteer members and increase their participation in department operations. The combination of these two actions has often been interpreted as a threat to the job security of the career firefighters. When firefighters feel that they are merely "tolerated, not respected" by government officials they are subject to increased levels of personal stress. (Craven, et al. '91)

During the past 20 years the career division has fluctuated between 10 and 14 firefighters assigned to frontline suppression duties. Several firefighters left the job for various personal or health reasons and were replaced by new hires. One firefighter retired with twenty-five years of service. Three died of heart attacks while off duty.

The stresses that are present and the manner in which the fire department administration addresses them are a part of the organizational culture of the MTFD. The topic of assessing organizational culture was presented in the National Fire Academy's Executive Leadership Course and serves as the background for this research. Staley (1999) points out that one of the responsibilities of fire service leaders is to create a safe and supportive workplace for their firefighters.

Time is a factor in the prevention of heart attacks. The American Heart Association (AHA) 1999 statistical update states that the chance of suffering a heart attack steadily increases with age.

"Never be complacent, never accept the death of a firefighter." (Werner, 1999)

## LITERATURE REVIEW

### Facts and Statistics – The General Population

The (AHA) states that Cardio-Vascular Disease is responsible for approximately 60% of all deaths in the United States. More than 2,600 Americans die from heart attacks or heart failure every day. From the time that they first started to archive these statistics in 1940 to their projected figures for the year 2000, the rate has more than doubled from 91.9 to 198.0 per capita of the general population.

Of those individuals that suffer their first heart attack, more than half of them will have had no previous symptoms. The statistics also indicate that 80% of those under age 65 who are suffering their first heart attack will die during its occurrence.

Further studies show that within six years of a recognized heart attack roughly one quarter of the victims will suffer a reoccurrence. Of this group 7% will experience sudden death.

An estimated 66% will never make a complete recovery. But, 88% of the individuals under age sixty-five are allowed to return to their occupations.

The AHA has identified at least thirty-five types of congenital heart disease. They estimate that there are over one million Americans currently living with these defects.

**Facts and Statistics – The Fire Service**

During the past several years the National Fire Protection Association (NFPA) has published a synopsis of the previous year's line-of-duty firefighter deaths. Washburn, LeBlanc, and Fahy, report the number of deaths and the percentage due to heart attacks. In 1995 there were 95 deaths, of which 50.5% were due to heart attacks. (1996) In 1996 there were 92 deaths, of which 48.9% were due to heart attacks.(1997) The total was later updated to 95 but did not report if the additional 3 were cardiac related. In 1997 the number of fatal heart attacks represented 40% of the 92 deaths. (1998) The NFPA (1999) reported that the 1998 firefighter deaths totaled 98 with only 39.8% resulting from heart attacks. That number tied the all time low for heart attack fatalities. In 1989 the fire service suffered its highest total of heart attacks with 63. (Fire Analysis and Research Division, 1993)

Firefighters that suffered fatal heart attacks were mainly from stress or overexertion. In 1997 thirty-five deaths were due to stress while three heart attacks occurred due to smoke inhalation. (Washburn, et al., 1998) The activities at the time of death also varied. One firefighter was reported to have died while participating in a physical fitness exercise.(Fire Analysis and Research Division, 1993)

Existing medical conditions were also cited as contributory to death in the reports. Washburn et al. (1999) state that one 34 year-old, active firefighter had been diagnosed as obese, hypertensive, and a diabetic prior to his heart attack. The NFPA reported that of four active

firefighters that died during a one year period; one had had the lower part of a lung removed, another was taking medication to prevent blood-clotting, the third had recently suffered from a viral infection that resulted in an inflammation of the heart tissue, and the last had had a leg amputation and was responding to act as a dispatcher.

A 1993 study by the NFPA also highlighted that 5 of the 10 firefighters under age 26 that had died from heart attacks were diagnosed with congenital heart problems.

In a study published in 1991, Craven et al. reported that Los Angeles, California firefighters receive more disability pensions for heart disease than for any other illness.

**Heart Attack Risk Factors**

The AHA lists five major controllable risk factors in the prevention of cardio-vascular disease. The greatest risk is to people that smoke tobacco products. At least 1 of every 5 cardio-vascular disease deaths is directly attributable to smoking. The products present in tobacco smoke have been reported to increase a person's risk of heart disease by 30% even if they are only exposed to second-hand smoke. The second risk factor is having high amounts of serum cholesterol in the blood stream. It is estimated that over 39 million Americans have over 240 milligrams per deciliter, or what is considered to be a dangerous level of cholesterol. The Framingham Heart Study showed that the risk of heart attack is highest when high-density lipoproteins (HDL) are low and the total cholesterol count is high. The AHA also indicated that blood screening is the only way to effectively measure an individual's cholesterol level. Overweight and obesity represent the next risk factor. The additional weight of fat increases exercise heart rate and blood pressure, decreases muscular endurance and metabolic efficiency and causes an increase in cardiac demand.(Wilford, Scharff-Olson, 1998) A 1998 report by the International Association of Fire Fighters (IAFF) states that excess fat amplifies heat stress and

may also cause myocardial injury. Physical inactivity has been established as a major risk factor for the development of coronary artery disease, a contributor to heart attack. The relative risk of inactivity compares to that of uncontrolled high blood pressure, high blood cholesterol, or smoking. Diabetes Mellitus has also been identified as a heart attack risk factor. It is estimated that more than 10 million Americans have physician-diagnosed Diabetes. Statistics show that 66% of individuals with Diabetes will die from some form of heart or blood vessel disease.

Although high blood pressure has been considered a major risk factor in heart attacks and its cause is generally unknown, it is easily detectable and very controllable. (AHA, 1999)

Brooks (1998) states that emotional factors have recently emerged in some research as more potent risk factors than once believed. Craven et al. (1991) observed that stress causes, mediates or exacerbates illnesses of all kinds including heart disease, a leading killer and disabling affliction in the fire service. Occupational stress was identified by the IAFF in 1999 as affecting personnel both on and off their jobs. This mental stress can accumulate and is very difficult to relieve. (Stein, 1998)

A 1991 Federal Emergency Management Agency (FEMA) study found that the risk of heart disease among Seattle, Washington firefighters increased with their duration of employment. Murphy (1999) suggested that social changes that hinder volunteerism are causing a lack of staffing and thus increasing the demands on current firefighters. Heat stress has also become greater because of today's fully encapsulating turnout gear. This causes an increase in cardio-vascular stress for the firefighter. (Clark, Petruzzello, Smith, and Bone, 1998)

"Working in emergency services demands that you be in great shape physically, mentally, and emotionally." (Staley, 1999)

**Statistical Trends**

The AHA reported that during the period from 1986 to 1996 that deaths due to Cardio-Vascular disease had declined by approximately 20%. The NFPA (1999) states that fatal heart attacks to firefighters has decreased by 33% since 1977. Washburn et al. (1999) observes that although the actual number is down, the proportion of heart attacks has remained relatively constant. He further noted that stress and overexertion resulting in heart attacks, continued to be the leading cause of fatal injury in 1998.

A 1998 FEMA publication reported that from 1986 to 1995 fire deaths in the United States decreased per capita by 36.2%. It also stated that the total number of fires had decreased by 17% and firefighter deaths were down 35%. Stevens (1998) stated that the statistics could be deceiving because there are fewer fires and less firefighters than in the past. He observed that 20 years ago roughly 12,000 Americans and 120 firefighters died in fires per year. That represented a ratio of 100 civilians to 1 firefighter. Current numbers reflect a ratio of 60 civilian deaths per firefighter death.

FEMA's Technical Advisory Committee (FEMA TAC) (1993) presented information stating that because of what was termed the "healthy worker effect" firefighters were less likely to die of natural causes at an early age than that of the general population. However, they also observed that this was likely to change as the firefighter approached retirement age. The NFPA (1993) reported that most of the deaths occurring to firefighters over the age of 60 were primarily volunteers.

**Organizational Culture**

"Americans view fire as an inevitable part of life." (FEMA 1993) Craven (1991) points out that there exists a casual relationship between fire service occupational stress and heart

disease. Adrenaline has been demonstrated to cause direct damage to heart tissue. The FEMA TAC (1993) has termed the hazards of fire suppression and the risk of premature death from heart disease and cancer as "Firefighters' Disease." There are no warm-ups or stretching exercises prior to firefighting. (Goodson, 1994) After only sixteen minutes of firefighting near maximal heart rates are developed. (Clark et al., 1998) During an emergency, no other occupation comes close to the physical demands on a firefighter. (IFSTA 1991) Stein (1998) states that some of the things we see and do take a physical and mental toll on us. Brooks et al. (1998) points out that firefighters suffer emotional trauma from the threat of exposure to disease when responding to medical calls. As firefighters remain on the job they face the increased risk of heart attack. Washburn et al. (1999) explains that the proportion of firefighters that suffer fatal heart attacks increases significantly after age forty.

Craven et al. (1991) stated that much of the stress faced by the firefighter is a result of occupational practices. He points out that many of the stressors originate in the lack of job satisfaction. These include the lack of recognition for performance, the lack of encouragement for innovation, the lack of advancement opportunities, and the lack of respect shown to them by management. They are often the victims of unclear expectations and boredom.

The fire service has traditionally held to a philosophy of risk-taking. Basic attitudes, beliefs and values are largely masculine and have a "frontier mentality". (Craven, et al., 1991) Firefighters maintain reputations associated with courage and bravery exposing themselves to high levels of risk with very little concern for personal safety. (FEMA 1996) Firefighters will often cover over personal depression because they believe it to be a sign of weakness. This is despite overwhelming evidence to the contrary. Although risk factors are well documented, firefighters may be unaware of their own specific problems and how to deal with them.

Physical fitness programs for the fire service could lessen the risk of injury and death. However, opposition to them is deeply rooted in the firefighters themselves. Many firefighters grew up when the words "exercise" and "physical fitness" had negative connotations. Poor performance by an individual was often punished with push-ups or running laps. People who exercised voluntarily were seen as "health nuts". Thus, they formed a poor attitude toward exercise. (Hayford, 1997) Other firefighters are concerned about their job security. They are afraid that if the standard is raised they will no longer be able to maintain their employment. (Round and Green, 1997) NFPA 1582 recognizes the need to continually evaluate firefighter health for their own safety. This has made the document very controversial and has failed to be widely accepted. (FEMA TAC, 1993) And Goodson (1994) observed that some unions would rather risk death than have an individual retired that couldn't correct a problem. He likened this to a fire chief that wouldn't test hose because he was afraid it would break. IFSTA (1991) points out that many fitness programs have been abandoned because the participants lost their motivation. They state that to keep a program operating requires total participation. This includes all members from the rookies to the fire chief.

Opposition to physical fitness programs also can be seen on the part of some administrations. Governing bodies have balked at the investment for equipment and training. They further expressed fear of additional expenses being caused by injuries that might occur during exercise. And in some cases the fire chief was reluctant to provide "on duty" time for workouts. (Goodson, 1994) However, Davis and Curtis (1983) claimed that the most frequent cause of failure of a fitness program resulted from a lack of funds.

In a letter to the editor of *Firehouse Magazine*, Remillard is critical of the advertisement of tobacco products and references the Pendleton, Oregon Fire Department's "no tobacco"

policy. Stevens (1998) states, "the yearly statistics prove that the lack of personal responsibility toward one's own health and safety kills firefighters."

**Wellness Programs**

It is a requirement of NFPA 1500 that fire departments establish a Health and Safety Plan. (Clark, 1999) The IAFF (1998) suggests a holistic program that encompasses medical evaluation, fitness, rehabilitation and behavioral health. Schirmer wrote in 1983 that medical surveillance is important for firefighters because traditional methods of worker protection, engineering controls or industrial hygiene monitoring may at times be impractical in the fire environment. The IAFF states that health promotion should include career guidance, family orientation, education on weight control, healthy heart, hypertension, stress management, nutrition, preventative medicine, substance abuse, smoking cessation, and retirement planning. Brooks et al. (1998) expressed the need for everyone to own the plan. All parties must share the responsibility. This includes management, associations, unions, regulatory agencies, professional groups and especially the individual firefighters. Schirmer (1983) stated that there needs to be an agreed upon criteria and mechanisms for handling those determined to be unfit for work. Washburn et al. (1998) pointed out the need to address firefighters' pre-existing medical conditions if progress is to be made in reducing their deaths. Programs for tobacco use cessation and similar problems that are department sanctioned and non-punitive should be made available to members. (IAFF 1998)

Cooperation of involved parties has established several active programs in the fire service. Responding to concerns about firefighters' health, the International Association of Fire Chiefs (IAFC) and the IAFF sponsored the Fire Service Joint Labor/Management Wellness/Fitness Initiative. Their purpose is to study the problems of health and fitness and

make cooperative suggestions for dealing with them. (IAFF 1998) To help provide more detailed information for fatality studies the new National Fire Incident Reporting System has developed a "fire casualty mode". This mode allows for the reporting of information regarding a firefighter's condition prior to their injury and identifies specifics and contributing factors of the incident. (Worley, 1999) Jones (1998) reported that Fairfax County; Virginia Fire Department has opened its own Occupational Health Center. The Fire Department of the City of New York has established an Annual Wellness and Physical Fitness Program to screen and rehabilitate its members. (VonEssen, 1999) And the IAFC (1999) reported that a cooperative effort by the Compensation Funds of New Hempshire, the Professional Firefighters of New Hampshire, and the New Hampshire Association of Fire Chiefs, created guidelines for fitness programs for their state. This program caused the New Hampshire Workman's Compensation Fund to recognize fitness programs as a part of firefighters' employment and not just a recreational activity.

Washburn et al. (1998) states that by using NFPA 1582, Medical Requirements for Firefighters, to screen personnel it may be possible to reduce the number of firefighter deaths due to heart attacks.

**Fitness Program Benefits**

The AHA (1999) reported that better food habits could lower high blood cholesterol and reduce a major heart attack risk factor. Their studies also show that physical activity brings psychological benefits as well as improved cardio-vascular health. Physical activity reduces feelings of depression, improves a person's general mood, and promotes feelings of well being. O'Conner (1998) stated that walking is a good way to supplement a normal training routine and allows one to just relax.

**Summary**

The statistics presented by the AHA and NFPA indicate that the rate of line-of-duty firefighter deaths does not mirror that of the general population. Newly hired firefighters are generally presumed to be in excellent physical condition because of the entrance requirements and levels of competition they must meet to obtain employment. This is termed the "healthy worker effect" and may explain the lower death rates at earlier ages. However, the nature of firefighting and its surrounding culture can cause members to develop unhealthy lifestyles. The cumulative effects of growing levels of job stress further exacerbate any risk factors that may be present in a firefighter's medical history. This is seen in the increased rate of fatal heart attacks suffered by firefighters over the age of forty. The longer that an individual remains in the fire service, the greater their risk of experiencing a heart attack.

The controllable risk factors of heart attack are well documented and with proper changes in lifestyle can be reduced. Fire service management should be responsible to initiate wellness programs within their departments. For these programs to be effective all involved parties must support them. Participants need to be educated to the importance of healthy lifestyles and motivated to the performance of practices that can reduce firefighter deaths.

Cooperation of labor, management and administration is essential in designing rehab programs for firefighters that fail to meet medical standards. They must also determine the conditions under which a firefighter should be removed from active service to prevent further injury or death to themselves or their co-workers.

"And we've only got one opportunity to stop a cardiac arrest." (Onieal 1999)

# PROCEDURES

## Research Methodology

Historical research was used to conduct a literature review of pertinent information on the subject of firefighter line-of-duty death from stress related heart attacks. This search began with the use of the National Fire Academy's Learning Resource Center's On-line card catalog. Recent issues of fire service trade magazines were scanned for relevant articles. The FEMA Publication Center and the NFPA's One-Stop Data Shop were electronically contacted and supplied numerous reports and studies on the subject. An electronic link was made through the Internet to the AHA website and related articles and updated statistics were downloaded for use.

A questionnaire was designed to determine the presence of controllable risk factors that were associated with recent stress induced heart attacks among on-duty firefighters. (Appendix A) The FEMA website, USFA National Fallen Firefighters Memorial Database, was reviewed for addresses and contact information for departments that had filed notice of this type of event. The questionnaire, a cover letter (Appendix B) a return envelope and a separate postcard to request copies of the results were mailed to fire chiefs or contact persons listed over the past two and one-half years. The postcard was to allow chiefs to respond confidentially. Thus, protecting their anonymity regarding any comments they wanted to make and preserving the dignity of their fallen firefighter.

Eighty-five surveys were distributed. Thirty-two completed surveys were returned. The figures were used to establish representative numbers for each of the controllable risk factors. These numbers were charted and are presented in the Results section of this paper and observations are made in the Discussion section.

The MTFD's personnel records and minutes from the Accident Prevention and Safety Committee meetings were reviewed for comparison to the findings of the literature review and the questionnaire. Several confidential, personal interviews were conducted with members of the career division on various dates to supply information regarding the presence of controllable risk factors among the members. Because of the nature of management/employee relations it was necessary to maintain anonymity among the respondents. A chart (Appendix C) was created to display the ages of the current members of the career division and project their increase relative to retirement. This information is presented in the Results section of this paper and observations are made in the Discussion section.

**Assumptions and Limitations**

The literature review was focused mainly on fire service publications. Medical findings regarding the statistics of risk factors was limited to information reported on the AHA website. More detailed information may be available in health and medical journals and could possibly supply further insight to the causes of these heart attacks.

The information regarding the contact personnel for departments that had suffered the loss of a firefighter was not always complete. Thus, several of the departments were not surveyed.

The survey itself did not present definitive questions regarding any non-controllable risk factors that the firefighter may have had. There were replies with that information included in the comment section.

It is also understood that the person answering the survey may have been unaware of any relevant family history regarding hereditary risk factors. The survey distribution was limited to

the past two and one-half years presuming that the respondent was familiar with the fallen firefighter.

The statistics do not reflect "off duty" heart attack deaths whose causes may have been exacerbated by the stresses of the individual's career.

## RESULTS

### Answers to Research Questions

Research Question 1. During the years that were reviewed for this study the rate of death due to heart attacks for the general population was approximately 20%. That percentage indicates that 1 of every 4.9 deaths was due to cardio-vascular failure. The occurrence of heart attack increases with age. It is the fifth leading cause of death for individuals between the ages of 15-24. For the 25-64 age group (25-44 and 45-64) heart attacks represent the second leading cause of death behind accidents (ages 25-44) and cancer (ages 45-64). It is the leading cause of death for persons over the age of 65. It is estimated that there are 250,000 sudden cardiac deaths each year.

During the same time period the rate of death due to heart attacks for the fire service was approximately 46%. The initial estimate would reflect a rate that is double that of the general population. However, the number for the general population reflects all types of cardio-vascular failure. The number for the fire service is predominately stress related heart attacks. Thus the rate would be much greater than for the general population.

There are an estimated 1,058,300 firefighters in the United States. Although career firefighters represent approximately 25% of the total, they suffer 33% of the fatal heart attacks.

In the age group of 41-60 the rate of death due to heart attack has been roughly 4 times as great as the 21-40 age group. Heart attack is the leading cause of line of duty death for firefighters over the age of sixty.

It should also be noted that so far this year there have been thirty-four stress-related fatal heart attacks suffered by firefighters in the line-of-duty. Four of these occurred after the surveys were distributed.

Research Question 2. The AHA has identified five controllable risk factors for the prevention of heart attack. They are smoking, high cholesterol, overweight or obesity, physical inactivity, and Diabetes Mellitus.

Smoking, overweight or obesity, and physical inactivity are usually apparent in an individual's lifestyle or appearance. High cholesterol and early stages of Diabetes Mellitus normally require medical screening or testing to be identified. They all can be controlled.

Davis and Curtis (1983) state that individuals who smoke have heart attacks nearly 10 times as often as those who don't. Cigarette smoking is the most important preventable cause of premature death in the United States. It is the biggest risk factor for sudden cardiac death. (AHA 1999)

Goodson (1994) observed that too many firefighters are overweight and out of shape. They also are known for their high-fat diets. Stevens (1998) points out that poor fitness was the leading cause of firefighter deaths 20 years ago and remains significant today. In 1996 it was responsible for one third of all line-of-duty firefighter deaths.

High blood pressure had been recognized as a controllable risk factor. However, because of the ease of detection and the effective treatments available, it is not generally viewed as a

major threat. Untreated high blood pressure is still regarded as dangerous and can intensify the impact of other risk factors.

Stress has recently been recognized by several studies as having a greater influence on the relative health of individuals than was previously believed. The effects of stress are cumulative and are not easily relieved. Stress can be generated by physical, mental and emotional demands on individuals both on and off the job.

There are also several uncontrollable risk factors associated with heart attacks. While they can't be controlled they need to be recognized as contributing factors to firefighter line-of-duty deaths. They are sex, age and hereditary diseases such as coronary artery or cardio-vascular disease. Persons having one or more risk factors face an increased rate of heart attacks. Thus, a person who smokes tobacco and is over forty years old is at a much greater risk than a non-smoker of the same age is.

Research Question 3. The following questionnaire was distributed to eighty-five fire departments that had suffered the loss of a firefighter due to a stress-related heart attack within the past two and one-half years. Thirty-two surveys were returned. The totals are listed below.

Did your firefighter have any one or more of the following risk factors?

PERSONAL HABITS OR CONDITIONS

__9_ Regular or heavy use of tobacco products

__4_ High Cholesterol

_14_ Overweight

__8_ Physically inactive

__0_ Untreated high blood pressure

_10_ No known risk factors

## STRESS FACTORS

Is your department:

__0_Yes _32_No facing layoffs?

__9_Yes _23_No operating with reduced staffing?

## PREVENTION

Does your department:

_13_Yes _19_No have regular (annual) health screening for members?

__6_Yes _26_No have a regular fitness/exercise program?

__4_Yes _28_No offer any organized stress reduction programs?

The surveys also indicated:

- 7 firefighters had at least 2 controllable risk factors
- 3 firefighters had at least 3 controllable risk factors
- 6 firefighters with controllable risk factors were in departments operating with reduced staffing
- 2 firefighters with no controllable risk factors were in departments operating with reduced staffing
- 3 firefighters that were overweight and physically inactive were in departments that had regular fitness/exercise programs

Space was left at the bottom of the survey for comments from the respondent. These comments included:

- firefighter served only as a safety officer, he was 70 years of age and had been treated for a cardiac condition

- department has had a wellness/fitness program for two and one-half years, firefighter was 64 years of age
- department has annual and semi-annual physicals, also has testing by a Certified Fitness Coordinator, our deceased brother also suffered from diabetes (controlled)
- firefighter had a previous heart condition but had been released from doctor's care
- department has a physical program in place, member was an interior qualified firefighter who had passed his last physical
- department spends $5,000/year on exercise equipment but has no mandate for its use, following the loss of their firefighter the city is allocating funds for annual screening in the 2000 budget
- department recommends medical check-ups but does not mandate them
- the firefighter was suffering from extreme diabetes, high blood pressure, and cardio-vascular problems
- the firefighter was a smoker but otherwise maintained a healthy lifestyle

These results and comments will be reviewed in the Discussion section of this paper.

Research Question 4. Because the career division is relatively small (19 members) the following data was gathered through personal interviews and discussions.

Controllable risk factors in the career division of the MTFD:

__5_ Regular or heavy use of tobacco products ( 3 smoke, 2 use chewing tobacco)

__2_ High Cholesterol

__5_ Overweight

_11_ Physically Inactive (do not participate in organized fitness activities)

__0_ Untreated high blood pressure

__2_ No known risk factors

Although the department is not facing layoffs it is operating with reduced staffing as a result of retirements and decreasing levels of volunteer members. Most apparatus respond with only the firefighter/operator on board. In many cases this requires a single firefighter to initiate operations on the scene of an emergency until other apparatus or volunteers arrive.

The MTFD has recently begun Office of Safety and Health Administration mandated medical screening for users of self-contained breathing apparatus. However, these physicals have not been consistent with the guidelines that are established in NFPA 1500.

The department has a fitness/exercise program. However, participation is voluntary and no money has been budgeted for it for several years.

Members of the department have expressed concern over the levels of stress that they are exposed to because of the perceived lack of respect they receive from the administration. They are also exposed to increased stress levels because of their participation in the department's first responder program. All but one member of the career division were hired prior to the initiation of the program. One member cited the stress of responding to first aid calls as a contributing factor in his decision to retire. The department has no stress reduction program at this time.

Brooks (1998) cites that it can be assumed that heart attacks are a partial factor in an aging force. By reviewing personnel records a list of members ages on their starting date of employment was secured. Using the minimum and maximum contributory pension years as a factor a second list was established to determine the ages of the members when eligible for retirement. (Appendix C) The resulting chart exhibited that most members will be in the age ranges that have the highest incidence of stress related heart attacks prior to their retirement.

Research Question 5. "Past emphasis on maintaining firefighting apparatus is short-sighted because the greatest cost and most important asset of any department is its firefighters." (Davis and Curtis, 1983 p.)

The fire service has made numerous attempts to reduce the physical stress on firefighters through engineered solutions. Lighter weight equipment and turnout gear that is designed to reduce heat stress are examples of these efforts. (Ballum, 1999) However, Murphy (1999) emphasizes that to reduce firefighter heart attack deaths, departments need to develop wellness programs that include stress management and annual health risk analysis. The NFPA highlights the importance of medically screening firefighter applicants, establishing fitness requirements, and providing diet and exercise education and annual health testing. Point number 5 of the "Pascrell Bill", Firefighter Investment and Response Enhancement, H.R. 1168, calls for the establishment of wellness and fitness programs for firefighting personnel to ensure that such personnel can carry out their duties. (Manning, 1999)

"Above all, attention must be focused on the significant problem of fire service personnel who have heart problems, yet are allowed to remain active in firefighting." (NFPA 1993) The IAFF (1998) states that mandatory physical and mental exams should be administered annually. This would initially provide a baseline for each member and then highlight any changes in their health. The Standard on Medical Requirements for Fire Fighters, NFPA 1582, refers to the annual physicals as certification for individuals to continue participating in training or emergency operational environment as a firefighter. However, their time frame is adjusted according to the age of the individual. For firefighters under the age of 29 a physical shall be given every 3 years. For ages 30 to 39 the physical shall be every two years. And physicals shall be administered annually for members of 40 and above.

The Fire Department Occupational Safety and Health Program, NFPA 1500, also calls for the establishment of a safety and health committee by each fire department. This committee shall conduct research and develop recommendations regarding safety and health for the department. They shall serve in an advisory capacity to the fire chief.

These programs will depend on the cooperation of all involved members if they are to succeed. The company officers or middle management can be very influential toward the success or failure of any new program. It is essential that they display a high regard for personnel safety, including physical, psychological and emotional fitness. (Compton 1999)

**Chart Rationale**

The chart (Appendix C) was developed to exhibit the ages that MTFD personnel will reach prior to their retirement. The bottom line indicates the age of each member on the date of his or her hire. The State of New Jersey Police and Fire Retirement System currently requires firefighters to complete 25 years of service for a regular retirement. Firefighters may continue to build pension benefits for the following 5 years. Thus, the members' benefits reach their maximum at 30 years. The chart displays the members' age at hire plus 25 (middle line) and 30 (top line) years of service to display their projected ages at retirement. The chart was created for use as a motivational tool to encourage younger firefighters to develop healthy lifestyles prior to reaching age 40.

## DISCUSSION

"There is nothing fun about pumping on the chest of a comrade who has been trying to die for years." (Stevens, 1998)

**Fire Service Culture**

Each year almost half of the firefighters that die in the line of duty are victims of stress related heart attacks. Werner (1999) charges fire service leaders to determine what went wrong and take steps to prevent it from happening again.

Physical fitness and stress management programs are generally preventative in their nature. (Craven et al., 1991) However, as the National Fire Data Center reports, United States firefighters focus on response rather than prevention. In one case Round and Green (1998) pointed out that a physical fitness program had failed even though the firefighters were offered monetary rewards for improving fitness scores.

The attitudes of many current firefighters can be detrimental to their health. The more active members will sometimes develop a "nothing can happen to me" attitude, while individuals in slower departments feel "nothing ever happens to me". Both of these philosophies lead to a complacency that can contribute to stress related heart attacks. Washburn et al. (1998) explains that there is a need for "behavioral" changes in the fire service if we are to further reduce the number of annual firefighter deaths.

A review of the MTFD's Safety Committee's minutes seems to support the theory of complacency towards safety. During the last two years the average attendance was 46%. That represents less than half of the members on the committee. The safety committee should be considered as a support of the safety program. The attitude of the personnel will determine the success of the program. (IFSTA 1991)

**Controllable Risk Factors Survey**

The results of the survey indicated that 21 of the 32 firefighters were influenced by at least one of the controllable risk factors prior to their deaths. Of the 21 firefighters, 47% were reported to have multiple controllable risk factors.

The leading reported factor was overweight. Fourteen firefighters or 44% of the total responses were overweight. Eight firefighters were reported as being physically inactive. Generally, the physically inactive firefighters were also listed as overweight. The second leading factor was smoking. Approximately 28% of the firefighters that had fatal heart attacks were smokers.

None of the responding departments are facing layoffs. Nine departments are operating with a reduced staff. Three of the firefighters that suffered fatal heart attacks were members of these departments. They had no other controllable risk factors.

Slightly more than 40% of the departments reported having regular medical evaluations of their members. Four departments offer organized stress reduction programs. And six of the departments report that they have physical fitness programs. However, these programs are not always mandatory. Three of the firefighters that were reported as overweight were in those departments.

**Wellness Programs**

The IAFF states that health programs should encompass all of the areas necessary to the welfare of the firefighters involved. These areas include, weight control, nutrition, cholesterol control, tobacco use cessation, fitness, stress management, hypertension, preventative medicine, infection control, substance abuse, retirement planning, and work related issues.

Physical fitness programs need to involve all members of the department and should be positive rather than punitive. (IAFF, 1998) The AHA claims that these activities have demonstrated the ability to reduce or eliminate all of the controllable risk factors of heart attacks. FEMA (1996) presented research that indicated that fitness programs were responsible for reducing the number of habitual smokers in a department and had actually helped the members increase their physical work capacity. NFPA 1500 directs fire departments to provide members with a tobacco use cessation program.

A further benefit of physical exercise is its ability to help relieve stress. (IFSTA 1991) Imbody (1999) has also emphasized that individuals who attend religious services demonstrate statistically positive differences in their blood pressure and general health. And Stein (1998) sees humor as a way to cope with daily tensions on the job. Exercise, prayer and laughter can all serve as outlets for stress.

The evaluation of the MTFD indicated that 5 of the 19 members use tobacco products, at least 5 are overweight, and only 3 participate in organized physical fitness programs. The review of the wellness programs suggests that physical exercise is beneficial in reducing both weight and incidence of smoking. Thus, it would be a logical starting point to begin a wellness program for the MTFD.

The chart in Appendix C can be used to help motivate members to participate in a physical fitness program. The statistics by the NFPA indicate that the occurrence of stress related heart attacks increases greatly when individuals reach the age of 40.

**Medical Evaluations and Job Fitness**

"It would be dangerous, to not only the firefighter himself, but to coworkers and the public he protects to allow him to continue if he has a significant health impairment." (Schirmer

1983) Washburn et al. (1999) reports that in the past 22 years 579 line-of-duty firefighter heart attack victims had medical histories available for study. This information revealed 49.7% had suffered previous heart attacks or had had coronary bypass surgery. Another 31.8% had severe arterioscerotic heart disease. And another 12.8% were diagnosed with either hypertension or diabetes. In 1998, 11 of the 39 firefighter that died from heart attacks had previously known cardiac problems. The AHA states that sudden death occurs 4 to 6 times as often during a recurrent heart attack. Thus, individuals that have had a previous heart attack are more likely to die during their second. Carter (1999) addressed the question of deciding when to retire. He stated that one should ask oneself, "am I a hindrance to anyone or anything?" Dying in the middle of a fire scene would definitely be a hindrance to the operation.

Guidelines have been established by the NFPA as to what medical problems should cause a firefighter to be removed from active duty. Departments need to adopt policies that will prevent firefighters that are at high risk of heart attack from actively participating at emergency operations. Washburn reported in 1999 that one firefighter had been evaluated for a heart transplant and was still serving as a driver at the time of his death. It was fortunate that no other firefighters' lives were lost with his.

The Fire Department of the City of New York (FDNY) developed a wellness program that included medical screening for their firefighters. One 49 year-old, lean, non-smoker was determined to have a life threatening heart problem. Although he had no outward appearance or pain, further testing confirmed the situation. He was removed from active service. The doctor's prognosis stated that one more fire call could have been fatal. Although he is no longer performing the job he loved, he did not become a statistic for this report. The FDNY saved another life.

"Your heart is your life and your life effects your heart." (Brooks, et al., 1998)

## RECOMMENDATIONS

"No amount of regulations, safety equipment or training can stop a firefighter from dying because of poor physical conditioning. (Stevens, 1998)

It is imperative that fire departments begin screening not only their new hires but also their existing firefighters according to the guidelines presented in NFPA 1582. Labor, management and administration need to be involved in the implementation of this standard. They will need to establish procedures for compliance and alternatives for firefighters that fail to meet certification. Cooperation of the all members is necessary as each individual must report any changes in their medical condition that could affect their job to their fire departments appointed physician. Time is a factor. "Less obvious, more lethal heart attacks will increase unless swift action is taken. (Brooks, et al., 1998)

It is necessary for fire departments to develop no-tobacco use policies. The IAFF states that new candidates should be tobacco-free on appointment and should remain that way through their career. NFPA 1500 requires the development for tobacco use policies for current members and new recruits. Each fire department should assist any member that uses tobacco in finding a cessation program to help them quit.

Fire departments should establish mandatory physical fitness programs and require the participation of all members. Company officers should become advocates of total wellness programs as they have the direct influence on the majority of the firefighters. Departments need to adopt physical exercise as a consistent lifestyle.

It is also recommended that departments develop comprehensive stress management programs and make them an integral part of fire service training. (Brooks, et al, 1998) The IAFF recommends that this training be given to new recruits and be reviewed during annual training sessions.

Personal participation in stress relieving activities should be encouraged. *Stress Management: Model Program for Maintaining Firefighter Well-Being* is available through FEMA/USFA. This book highlights many stress reduction techniques. Craven et al. (1991) suggests those activities such as church and social groups can help relieve stress accumulated on the job. Imbody (1999) cites a study by the National Institutes for Healthcare Research that state that active religious participation promotes beneficial effects on mental health.

Departments should encourage even simple exercise activities such as walking to begin wellness programs. O'conner (1998) reported that walking could be the perfect exercise for all age groups. It can have beneficial effects both the physical and mental conditions of the participant. As he said, "at the end of your walk the complexities of life just don't seem quite as overwhelming."

It should also be recommended that all fire apparatus be equipped with automatic or semi-automatic external defibrillators and all members be trained in their use. (Gala, 1999) The AHA studies have reported that early defibrillation will greatly improve the chance of surviving a heart attack. With the prevalence of heart attacks among members of the fire service we should be prepared to save ourselves.

The Montgomery, Alabama fire department conducts monthly screening of their members' weights. This monitoring has been associated with their increased fitness scores.

(Williford and Scharff-Olson, 1998) Monthly monitoring of the simpler diagnostics such as weight and blood pressure should be performed by the firefighters themselves.

In conclusion it is the recommendation of this author that developing a mandatory physical fitness routine should be the initial step in building a wellness program. In most cases medical evaluation will be necessary to clear members for participation. Annual medical monitoring and the adopting of standards should be the next step. Stress management, tobacco use cessation, and other mental and physical health programs should be added to complete a total wellness program.

Firefighters are called upon daily to protect the lives of the members of their community. Fire service leaders need to develop, implement and participate in programs to provide for the wellness of their department. And as necessary they should provide positive motivation to encourage their firefighters' participation. Their lives may depend on it.

"I am my brothers keeper." (Carter, 1999)

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# APPENDIX A

### CARDIAC RELATED FATALITY SURVEY

Did your firefighter have any one or more of the following risk factors?

**PERSONAL HABITS OR CONDITIONS**

____ Regular or heavy use of tobacco products

____ High Cholesterol

____ Overweight

____ Physically inactive

____ Untreated high blood pressure

____ No known risk factors

**STRESS FACTORS**

Is your department:

____ facing layoffs?

____ operating with reduced staffing?

**PREVENTION**

Does your department:

____ have regular (annual) health screening for members?

____ have a regular fitness/exercise program?

____ offer any organized stress reduction programs?

Are there any comments you would care to add regarding your firefighter and/or your department?

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Please return by August 7, 1999
Thank You

# APPENDIX B

## SURVEY LETTER

Dear Chief:

I am currently gathering information regarding “line of duty” deaths of firefighters that are attributed to cardio-vascular failure. The American Heart Association identifies smoking, high cholesterol, overweight, physical inactivity, and untreated high blood pressure as the “controllable” risk factors in cardio-vascular disease. The purpose of this research is to determine if any one or more of these factors are common among the firefighters who have died from heart attacks. This material will be presented as a part of my final applied research project for the Executive Fire Officer Program at the National Fire Academy in Emmitsburg, Maryland.

Your Department was identified through the Fallen Firefighters Memorial Database as having experienced the death of a firefighter due to stress/heart attack within the past two and one half years. Please accept my condolences for your loss.

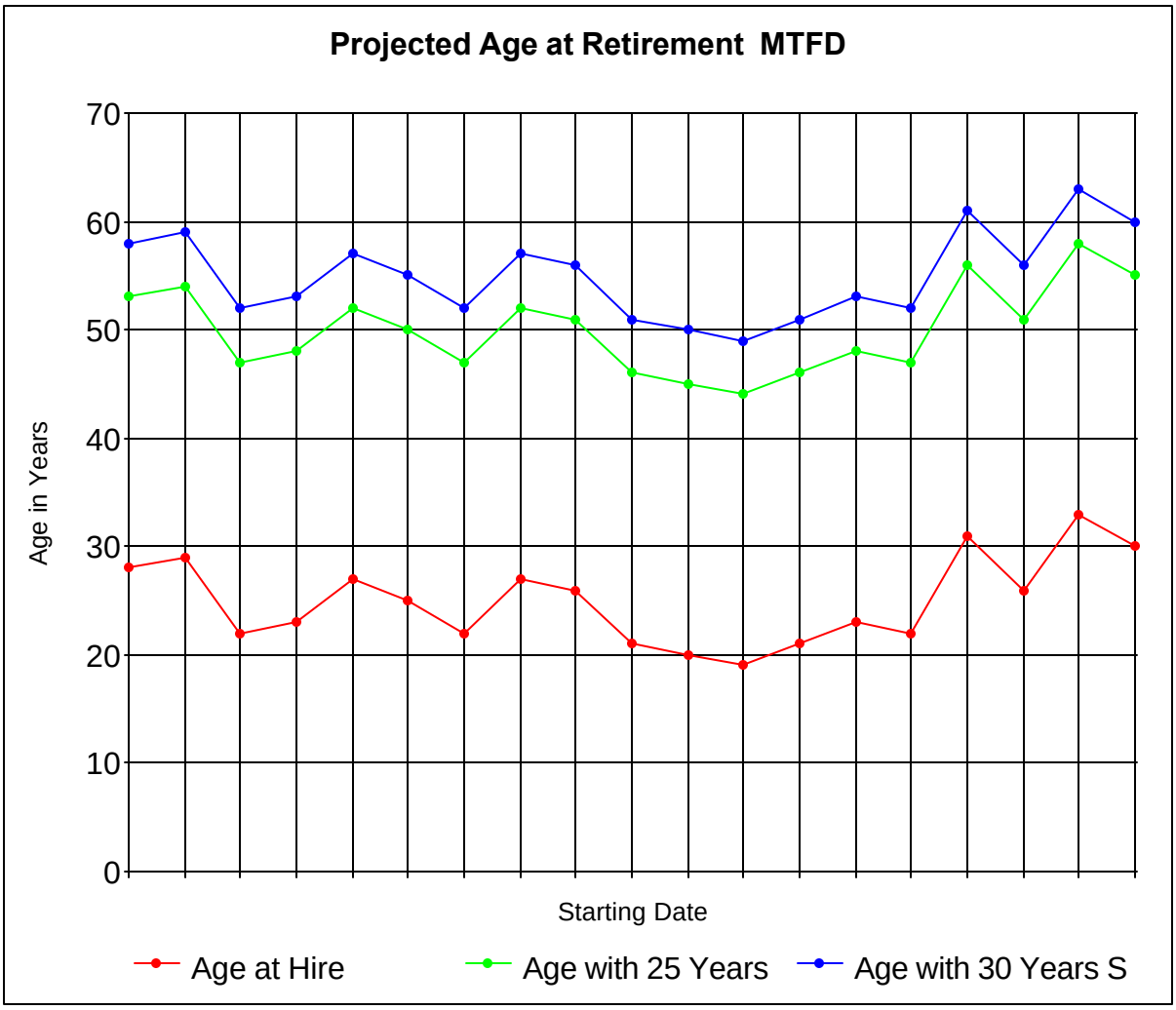
If you personally knew the firefighter or the information is readily available, I would appreciate it, if you could answer the enclosed survey regarding your Department and the Firefighter that passed away. This information is strictly confidential and is in no way intended to cast any shadows on any deceased brothers or sisters. I have included a separate postcard for your use to request a copy of the survey results. Thus, you need not identify your department or any individual on the survey itself.

If one particular risk factor can be identified as a common link between the deaths of our firefighters, we can develop strategies to prevent future losses. Please return the survey in the pre stamped envelope by August 7, 1999. Thank you for your time and efforts in this matter.

Sincerely,

Thomas W. Gaylord
Captain
Morris Township Fire Department

## APPENDIX C




The bottom line (red) displays the age at hire of the current members of the MTFD career division. The middle line (green) indicates the projected age for each member when eligible for retirement. The top line (blue) represents the age at which the member has reached the maximum benefits allowed by the pension system.

This chart is a reminder to the members that they will be in the higher risk age categories (40 years and over) prior to their retirement.